

What is claimed is:

1. A portable information terminal comprising:
 a display section for displaying an image corresponding
 5 to a received image signal;
 a light source for supplying light to the display
 section; and
 a driving section for controlling an operation of said
 display section;
 10 wherein the portable information terminal has a color
 display mode and a monochromatic display mode as a display mode
 of the image displayed in said display section.

2. A portable information terminal according to claim
 15 1, wherein multi-gradation display is set in said color display
 mode, and two-gradation display is set in said monochromatic
 display mode.

3. A device comprising:
 20 a display section for displaying an image corresponding
 to a received image signal; and
 a light source for supplying light to the display
 section;
 said device further comprising:
 25 a display mode judging section for judging a display mode

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of the image displayed in said display section;

a signal generating section for generating an image signal corresponding to the display mode of said display section by instructions of the display mode judging section;

5 a light source control section for controlling an operation of said light source in accordance with the image signal from said signal generating section; and

a signal processing section for processing the image signal in accordance with the image signal from said signal
10 generating section.

4. A device comprising:

a display section for displaying an image corresponding
to a received image signal; and

15 a light source for supplying light to the display section;

said device further comprising:

a display mode judging section for judging a display mode of the image displayed in said display section;

20 a signal generating section for generating a control signal and an image signal corresponding to the display mode of said display section in accordance with instructions of the display mode judging section;

a signal processing switching section for switching a
25 signal processing path in accordance with the control signal

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from the signal generating section;

a signal processing section for processing the image signal in accordance with the switching of the signal processing path of said signal switching section; and

5 a light source control section for controlling an operation of said light source in accordance with instructions from said signal switching section.

5. A device comprising:

10 a display section for displaying an image corresponding to a received image signal; and

a light source for supplying light to the display section;

said device further comprising:

15 a display mode judging section for judging a display mode of the image displayed in said display section;

a signal generating section for generating an image signal corresponding to the display mode of said display section by instructions of said display mode judging section;

20 a signal processing switching section for switching a signal processing path by instructions from said display mode judging section;

a signal processing section for processing the image signal in accordance with the switching of the signal processing path of said signal switching section; and
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a light source control section for controlling an operation of said light source in accordance with instructions from said signal switching section.

5 6. A device according to claim 4, wherein the device further comprises a frequency control section for switching the control of an operating frequency of said signal processing section in accordance with said control signal from said signal generating section.

10 7. A device according to claim 3, wherein said signal processing section has an n-bit memory, a digital-analog converter connected to the n-bit memory, a 1-bit memory, and a level shifter connected to the 1-bit memory; and

15 the display mode displayed by said display section has a multi-gradation display mode and a two-gradation display mode;

20 in the case of the multi-gradation display mode, said signal processing switching section selects said n-bit memory in said signal processing section, and said signal processing section processes the image signal generated by said signal generating section, by said n-bit memory and said digital-analog converter connected to the n-bit memory (n is a natural number equal to or greater than 2); and

25 in the case of the two-gradation display mode, said

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signal processing switching section processes the image signal generated by said signal processing section by said 1-bit memory and said level shifter.

5 8. A device according to claim 3, wherein said device has an n-bit memory (n is an integer equal to or greater than 2) connected to said signal processing switching section; and

10 the display mode displayed by said display section has a multi-gradation display mode and a two-gradation display mode;

15 when said display mode judging section judges the multi-gradation display mode, said signal processing switching section selects said digital-analog converter, and processes the image signal held in said n-bit memory connected to said signal processing section by said digital-analog converter; and

20 when said display mode judging section judges the two-gradation display mode, said signal processing switching section selects said level shifter, and processes the image signal held in said n-bit memory connected to said signal processing section by said level shifter.

9. A device comprising:

25 a display section for displaying an image corresponding to a received image signal; and

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a light source for supplying light to the display section;

said device further comprising:

a display mode judging section for judging a display mode
5 of the image displayed in said display section;

a signal generating section for generating an image signal and a control signal corresponding to instructions of said display mode judging section;

a signal processing switching section for switching a
10 signal processing path in accordance with the control signal from the signal generating section;

a signal processing section for processing the image signal in accordance with the switching of the signal processing path of said signal switching section; and

15 a light source control section for controlling an operation of said light source in accordance with instructions from said signal switching section.

10. A device comprising:

20 a display section for displaying an image corresponding to a received image signal; and

a light source for supplying light to the display section;

said device further comprising:

25 a signal generating section for generating an image

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signal corresponding to the image displayed in said display section;

a display mode judging section for judging a display mode of the image displayed in said display section;

5 a signal processing switching section for switching a signal processing path by instructions from said display mode judging section;

a signal processing section for processing the image signal in accordance with the switching of the signal processing path of said signal switching section; and

10 a light source control section for controlling an operation of said light source in accordance with instructions from said signal switching section.

15 11. A device according to claim 10, wherein the display mode of said display section in said device has multi-gradation display and two-gradation display;

said signal processing switching section has an n-bit memory (n is a natural number equal to or greater than 2) connected to the signal switching section;

20 said signal processing section has a digital-analog converter, a level shifter and a bit converting section connected to the level shifter;

when said display mode judging section judges the multi-gradation display mode, said signal processing

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said signal processing section processes the image signal generated by said signal generating section by the digital-analog converter;

said signal processing switching section selects said
5 image converting section in said signal processing section in the case of the monochromatic display; and

said signal processing section processes the image signal generated by said signal generating section by said image converting section and the level shifter.

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13. A device according to claim 10, wherein said display mode in said device has color multi-gradation display and monochromatic binary display, and

said bit converting section in said signal processing
15 section also converts the image signal from the color display to the monochromatic display.

14. A device according to claim 9 or 10, wherein the device further comprises a frequency control section for controlling a clock frequency in accordance with instructions of said signal processing switching section.

15. A device according to 3, wherein switching timing of the display mode switched by said display mode judging
25 section is set by the operation of a user.

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16. A device according to claim 3, wherein switching timing of the display mode switched by said display mode judging section is tag information in information described in a markup language.

17. A display unit having a light source, comprising:
a signal processing switching section for switching a processing path of an inputted image signal;

a signal processing section for processing said image signal in accordance with the switching of the processing path in said signal processing switching section;

a display section for displaying an image in accordance with the image signal from the image signal processing section;

and

a light source control section for controlling an operation of said light source in accordance with a signal from the signal processing switching section.

18. A display unit according to claim 17, wherein said display section is a liquid crystal cell, and

the display unit is constructed by

a display element having the liquid crystal cell and said light source, and

a driving section having said light source control

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section, said signal processing switching section and said signal processing section.

19. A display unit according to claim 18, wherein said
5 display element has:

the liquid crystal cell having a pair of transparent substrates, a liquid crystal layer nipped between the pair of transparent substrates, and an electrode group arranged in at least one of said pair of transparent substrates;

10 a reflection plate arranged on one face side of said liquid crystal cell; and

a light guide body arranged between said liquid crystal cell and said reflection plate such that said light source is arranged on a side face of the light guide body.

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20. A display unit according to claim 18, wherein said display element has:

the liquid crystal cell having a pair of transparent substrates, a liquid crystal layer nipped between the pair of transparent substrates, and an electrode group arranged in at
20 least one of said pair of transparent substrates;

a light polarizing maintaining diffusion reflection plate arranged on one face side of said liquid crystal cell;

a light guide body arranged between said liquid crystal
25 cell and said light polarizing maintaining diffusion

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reflection plate such that said light source is arranged on a side face of the light guide body; and

a light polarizing maintaining scattering layer arranged between said light guide body and said liquid crystal cell.

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21. A display unit according to claim 18, wherein the display mode in said display section has multi-gradation display and two-gradation display;

10 said signal processing section of said driving section has a digital-analog converter and a level shifter;

said signal processing switching section processes the image signal by selecting said digital-analog converter in said signal processing section when the display mode of said display section shows the multi-gradation display; and

15 said signal processing switching section processes the image signal by selecting said level shifter when the display mode of said display section shows the two-gradation display.

22. A display unit according to claim 18, wherein said 20 signal processing section in said driving section has:

a first signal processing circuit section having a digital-analog converter; and

a second signal processing circuit section having a level shifter;

25 said signal processing switching section switches one

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of said first and second signal processing circuit sections in accordance with an inputted control signal; and

only said switched first or second signal processing circuit section converts the inputted digital image signal to
5 an analog image signal.

23. A display unit according to claim 21, wherein said signal processing switching section in said driving section has an n-bit memory (n is a natural number equal to or greater
10 than 2) connected to the signal processing switching section.

24. A display unit according to claim 18, wherein said image signal generating section in said driving circuit section has:

15 a first signal processing circuit having an n-bit memory (n is a natural number equal to or greater than 2) and a digital-analog converter connected to the n-bit memory;

a 1-bit memory; and a level shifter connected to the 1-bit memory;

20 said mode switching section selects one of said first and second signal processing circuit sections in accordance with an inputted control signal;

said image signal generating section holds a digital image signal in the n-bit memory, and then converts the digital
25 image signal to an analog image signal by said digital-analog

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converter when said first signal processing circuit section is selected; and

said image signal generating section holds the inputted digital image signal in the 1-bit memory, and then converts the digital image signal to an analog image signal by said level shifter when said second signal processing circuit section is selected.

25. A display unit according to claim 18, wherein said driving section has a frequency control section for controlling a clock frequency in accordance with instructions of said mode switching section.

26. A display unit according to claim 25, wherein the display mode of the display section in said display unit has color display and monochromatic display,

said frequency control section in said display unit performs control for setting the clock frequency in the color display in said display mode to be lower than that in the monochromatic display in said display mode.

27. A display unit having a light source, comprising:
a mode switching section for switching a displayed image mode and controlling an operation of said light source;
an image signal processing section for processing an

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image signal in accordance with instructions from the mode switching section; and

a display cell for displaying the image in accordance with the image signal from the image signal processing section.

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28. A display unit according to claim 27, wherein the display unit is constructed by

a display element having said liquid crystal cell and said light source, and

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a driving section having said mode switching section and said image signal processing section.

29. A display unit according to claim 28, wherein said display element has:

15

the liquid crystal cell having a pair of transparent substrates, a liquid crystal layer nipped between the pair of transparent substrates, and an electrode group arranged in said pair of transparent substrates;

a reflection plate arranged on one face side of said liquid crystal cell; and

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a light guide body arranged between said liquid crystal cell and said reflection plate such that said light source is arranged on a side face of the light guide body.

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30. A display unit according to claim 28, wherein said

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display element has:

the liquid crystal cell having a pair of transparent substrates, a liquid crystal layer nipped between the pair of transparent substrates, and an electrode group arranged in said pair of transparent substrates;

a light polarizing maintaining diffusion reflection plate arranged on one face side of said liquid crystal cell;

a light guide body arranged between said liquid crystal cell and said light polarizing maintaining diffusion reflection plate such that said light source is arranged on a side face of the light guide body; and

a light polarizing maintaining type scattering layer arranged between said light guide body and said liquid crystal cell.

31. A display unit according to claim 28, wherein said image signal processing section of said driving section has a digital-analog converter and a level shifter;

said image signal generating section generates the image signal of analog multi-gradation by using said digital-analog converter when said mode switching section switches the display mode to a multi-gradation display mode; and

said image signal generating section generates the image signal of analog binary gradation by using the level shifter when said mode switching section switches the display mode to

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a two-gradation display mode.

32. A display unit according to claim 28, wherein said image signal generating section in said driving circuit section
5 has:

a first signal processing circuit section having a digital-analog converter; and

a second signal processing circuit section having a level shifter;

10 said mode switching section selects one of said first and second signal processing circuit sections; and

said selected first or second signal processing circuit section converts an inputted digital image signal to an analog image signal.

15 33. A portable terminal comprising:

a liquid crystal cell for displaying an image;

a light source for making light incident to said liquid crystal cell;

20 a mode switching section for switching a display mode of the image displayed in said liquid crystal cell;

a light source control section controlled by said mode switching section, and controlling an operation of said light source; and

25 an image generating section for generating an image

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signal corresponding to said display mode.

34. A display element comprising:

a liquid crystal cell having a pair of transparent substrates, a liquid crystal layer nipped between the pair of transparent substrates, and an electrode group arranged in said pair of transparent substrates;

a light polarizing maintaining diffusion reflection plate arranged on one face side of said liquid crystal cell;

a light guide body arranged between said liquid crystal cell and said light polarizing maintaining diffusion reflection plate such that a light source is arranged on a side face of the light guide body; and

a light polarizing maintaining type scattering layer arranged between said light guide body and said liquid crystal cell.

35. A display unit comprising:

a light source;

a liquid crystal cell having said light source therein;

a mode switching section for switching a display mode of an image displayed in at least said crystal cell, and controlling an operation of said light source; and

an image signal generating section for generating an image signal corresponding to said display mode.

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switching section selects said digital-analog converter in said signal processing section;

said signal processing section processes the image signal generated by said signal generating section by said digital-analog converter;

when said display mode judging section judges the two-gradation display mode, said signal processing switching section selects said bit converting section in said signal processing section; and

said signal processing section processes the image signal generated by said signal generating section by said bit converting section and said level shifter.

12. A device according to claim 10, wherein the display mode of said display section in said device has color display and monochromatic display;

said signal processing switching section has an n-bit memory (n is a natural number equal to or greater than 2) connected to the signal switching section;

said signal processing section has a digital-analog converter, a level shifter and an image converting section connected to the level shifter;

said signal processing switching section selects said digital-analog converter in said signal processing section in the case of the color display;

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36. A display unit according to claim 35, wherein the display unit has a display element and a driving circuit section, and

5 said display element has said liquid crystal cell, and
 said driving circuit section has said mode switching section and said image signal generating section.

37. A display unit according to claim 36, wherein said
10 display element includes a liquid crystal cell having:

 a pair of substrates;

 a liquid crystal layer nipped by said pair of substrates;

 plural pixels formed by an electrode kind arranged in
 at least one of said pair of substrates; and

15 said light source arranged in accordance with each of
 said plural pixels and constructed by including a metallic electrode, an organic LED layer and a transparent electrode from a substrate side.

20 38. A display unit according to claim 37, wherein said
 mode switching section in said driving circuit section switches
 one of the control of an operation of said liquid crystal layer
 in said liquid crystal cell and the control of an operation
 of said organic LED.

39. A display unit according to claim 38, wherein said image signal generating section in said driving circuit section has a digital-analog converter and a level shifter;

5 said mode switching section selects the control of the operation of said liquid crystal layer in said liquid crystal cell;

10 said image signal generating section generates the image signal of analog multi-gradation by using said digital-analog converter when said mode switching section switches the display mode to a multi-gradation display mode; and

15 said image signal generating section generates the image signal of analog binary gradation by using the level shifter when said mode switching section switches the display mode to a two-gradation display mode.

20 40. A portable information terminal having a display unit, an antenna, a wireless section connected to the antenna, and an entire device control section connected to the wireless section and said display unit and controlling the operation of an entire device;

wherein said display unit is the display unit described in claim 17 or 27; and

25 said entire device control section generates a digital image signal corresponding to a display mode of said display element in said display unit.

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41. A portable information terminal according to claim
40, wherein the portable information terminal has the display
unit, the antenna, the wireless section connected to the
5 antenna, and the entire device control section connected to
the wireless section and said display unit and controlling the
operation of the entire device; and

said display unit is the display unit described in claim
17 or 27.

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